GENERATIONAL COHORT DIFFERENCES IN TECHNOLOGY READINESS (TRI 2.0) AND MOBILE SELF-SERVICE TECHNOLOGY ADOPTION IN THE AIRLINE INDUSTRY – AN EMERGING MARKET PERSPECTIVE

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ABSTRACT

The primary objective of the study was to determine the influence of consumer age on passengers' level of technology readiness for using mobile applications in the airline industry and for adopting them in South Africa. Primary data was gathered from 315 respondents using a structured questionnaire. The sample included South African citizens who had travelled using an airline either nationally or internationally over a twelve-month period. Hierarchical regression analysis was applied to test the proposed hypotheses in the study. The findings indicate that airline mobile application adoption is influenced by technology readiness where consumer age is shown to have a negative relationship with technology readiness and with subsequent airline mobile application adoption. As a result, airline and airport companies must ensure that a structured research approach is followed whereby insights on the technology readiness levels of the respective target markets are incorporated into any mobile application launch or communication strategy aimed at increasing the adoption of mobile applications in the airline industry.

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INTRODUCTION

In the new millennium, the airline industry has seen the widespread implementation of self-service technologies (SSTs). These SSTs have been predominantly introduced for customer check-in and ticket purchasing, in the form of check-in kiosks, online websites and, most recently, mobile applications (Ku & Chen, 2013:87; SITA, 2013a:6–7; Wittmer, 2011:136). SITA (2013a) suggests that the implementation and use of SSTs is set to continue, with global expenditure on information technology (IT) in the airline industry exceeding the US$10 billion mark in 2013. The growth of SSTs in this sector and others is a result of their potential value to companies and their customers (Elliott, Meng & Hall, 2012:311). This value manifests primarily in the elimination of the service employee from the service encounter, which allows the airline industry to reduce labour costs, shorten queues, occupy smaller spaces, and minimise the total service time for consumers (Hassan, Sade & Rahman, 2014: 61; Elliott et al., 2012:311; Lee, Castellanos & Choi, 2012:731). Mobile applications have been marked as the key airline SST moving forward, with the platform providing a number of additional mobile functions such as boarding pass storage, check-in services, ticket purchase, baggage tracking and flight status updates (SITA, 2013a, 2013b, 2013c).

While mobile applications are seen as the way forward for airlines and airports alike, not much is known about consumers' readiness to adopt such SSTs. This is important due to adoption rates that are lower than expected for traditional SSTs (online websites and check-in kiosks) in the airline industry. This raises the question whether or not consumers are ready to adopt such technologies (SITA, 2013c; Lin & Chang, 2011:425). One construct that can be used to determine people's readiness to adopt new technologies is the technology readiness (TR) construct (Elliott et al., 2012:312; Lee et al., 2012:733; Lin & Hsieh, 2012:35; Parasuraman, 2000:308). According to Parasuraman (2000:308), technology readiness can be seen as an "overall state of mind" resulting from the combination of "mental enablers and inhibitors", which can be used to determine an individual's readiness to embrace and use new technologies. Although TR has been found to be effective in determining an individual's general perceptions of technology, initial studies on TR called for the inclusion of demographic variables, specifically generational cohorts, in future TR research (Parasuraman, 2000:319; Meuter, Ostrom, Bitner & Roundtree, 2003:905; Lee, Cho, Xu & Fairhurst, 2010). This is because age has traditionally had a negative relationship with technology adoption in that the older consumers get, the less likely they are to adopt new technologies. It follows that technology adoption is influenced by the exposure to and experience with new technologies achieved by each generation of consumers (Parasuraman & Colby, 2015; Hawkins & Mothersbaugh, 2010). While previous studies looked at the influence of consumer age on technology adoption behaviour, more recent studies have focused on generational cohorts and their influence on the updated technology readiness index, TRI 2.0.

As a result, this study utilised the generational cohorts as set out by Hawkins and Mothersbaugh (2010) and TRI 2.0 to investigate consumers' readiness to adopt mobile applications in the airline industry of South Africa. The study also sought to determine the influence of consumer age on each of the four dimensions (optimism, innovativeness, discomfort and insecurity) that make up TRI 2.0. In a review of the literature, no previous studies were found that applied the updated TRI 2.0 in researching the adoption of mobile applications in the airline industry of

South Africa as an emerging African economy. In addition, no study was found that integrated generational cohorts as a determinant of technology readiness. Taking the above into consideration, the authors argue that the influence of consumer age on technology readiness and the subsequent adoption of mobile applications in the airline industry of South Africa remains unexplored and tends to be unclear.

This paper provides an overview of the theory grounding the study and an explanation of its key constructs. The hypotheses are presented and an overview of the research methodology applied is provided. This is followed by the results, findings and managerial implications of the study.

LITERATURE REVIEW

Self-service technologies

Self-service technologies were first defined by Meuter, Ostrom, Roundtree and Bitner (2000:50) as "technological interfaces that enable customers to produce a service independent of direct service employee involvement". This allows consumers to utilise a service without "direct personal contact" with an employee (Chen, Chen & Chen, 2009:1249). Examples of SSTs include ATMs, interactive kiosks, online transactions and telephonic voice processing systems (Lee et al., 2012:731). According to Chen et al. (2009:1249), when SSTs are combined with the internet (fixed and mobile), a whole host of SST possibilities is opened up. According to Dabholkar (1996:29), the emergence of technology-based self-service options has been driven by "increasing labour costs and advances in technology". SSTs are capable of solving consumers' rapidly evolving service needs and can perform in a manner superior to the traditional consumer–employee interaction (Chen et al., 2009:1249). In addition, by allowing consumers to become active participants in the service delivery process, firms are better suited to handle "demand fluctuations", improve service quality, increase efficiencies and enhance overall operations (Elliott et al., 2012:311; Hassan et al., 2014:61; Lin & Hsieh, 2006:498; Meuter et al., 2003:899; Meuter et al., 2000:50).

Such new applications of SSTs are constantly being developed, providing the basis for the relatively constant introduction of new, innovative service platforms. As a result, SSTs are becoming vital to long-term business success in a rapidly changing technological environment (Meuter et al., 2000:50). Overall, new technologies, particularly in the services sector, have changed how services are produced, developed and delivered to consumers (Meuter, Bitner, Ostrom & Brown, 2005:61). However, despite the positive impact made by the introduction of SSTs, one prominent issue that has arisen is that not all consumers choose to use these new technologies as they may harbour negative feelings towards technology or fail to see SSTs as an improvement over traditional services (Lee et al., 2012:735; Meuter et al., 2003:899). Consumers' failure to adopt these SSTs can lead to financial loss (due to the large investments involved) and customer dissatisfaction (due to rising consumer demand for improved services not being met) (SITA, 2013c; Godoe & Johansen, 2012:39). With this in mind, it has become important to assess the extent to which consumers are ready to adopt such technologies (Elliott et al., 2012:312). One construct that can be used to assess consumers' readiness towards SSTs is that of technology readiness (Elliott et al., 2012:312; Parasuraman, 2000:308).

Technology readiness

Technology readiness is defined as "people's propensity to embrace and use new technologies for accomplishing goals in home life and at work", and the construct "measures an overall state of mind resulting from a combination of mental enablers and inhibitors to determine a consumer's preference to use new technologies" (Parasuraman, 2000:308). According to Lai (2008:19), this implies that an individual's beliefs about technology have both positive and negative aspects, which jointly influence whether or not an individual is ready to adopt a new technology. The positive views will push individuals towards new technologies and the negative views will pull them away (Parasuraman & Colby, 2001:29). Parasuraman and Colby (2001:33) state that these beliefs can be divided into four distinct dimensions, namely "optimism", "innovativeness", "discomfort" and "insecurity". Optimism looks at the positive aspects of technology, such as not being limited to regular business hours, having more control, enhancing people's lives, and being more efficient at work (Lai, 2008:19; Parasuraman & Colby, 2001:34–35). Innovativeness relates to the extent to which an individual believes they are at the "forefront" of testing new technological innovations (Lai, 2008:19; Lin & Chang, 2011:428; Parasuraman & Colby, 2001:38). According to Lin and Chang (2011:428), discomfort refers to the extent to which people may have a "prejudice" against technology. Although the discomfort dimension appears related to the insecurity dimension, they differ in that discomfort focuses on a "lack of comfort" while insecurity deals with the trust side of the technological interaction (Lai, 2008:19; Parasuraman & Colby, 2001:44). Examples of insecurity are hesitance to provide credit card information and concerns about information reaching its destination (Parasuraman & Colby, 2001:44–45). According to Lin and Chang (2011:425), optimism and innovativeness are viewed as the positive dimensions (contributors) while discomfort and insecurity are viewed as the negative dimensions (inhibitors).

According to Parasuraman and Colby (2001:58), it is important to understand that the four dimensions of TR are "independent" of each other, which means that an individual can simultaneously praise and fear technology. In order to bring these four dimensions together, Parasuraman (2000) developed a 36-item scale called the technology readiness index 1.0 (TRI 1.0) to measure these dimensions and assess a person's overall level of TR (Lin & Hsieh, 2012:50). Since the conceptualisation of TRI 1.0, Parasuraman and Colby (2015:59) have updated and refined the index into TRI 2.0. This updated index presents a more condensed index with respect to the number of statements under each dimension, yet the conceptual underpinnings of TR remain the same. It is also perceived as more suitable in the investigation of modern technology adoption, specifically mobile technology such as airline mobile applications. Based on the findings of numerous studies, it has been established that TR is an effective indicator of technology adoption (Parasuraman & Colby, 2015; Astuti & Nasution, 2014; Elliott et al., 2012; Lin & Hsieh, 2012; Lin & Chang, 2011; Parasuraman & Colby, 2001; Parasuraman, 2000). Therefore, against the background provided above, it is hypothesised that:

H_1: *Technology readiness positively influences passengers' intentions to adopt mobile applications in the airline industry.*

Despite the effectiveness of TR in predicting technology adoption behaviour, Parasuraman and Colby (2015:73) have called for the inclusion of different "generational cohorts" into future research using TRI 2.0. The inclusion of generational cohorts aims to capture the impact that differing levels of exposure to and experience with technology have on new technology adoption, as experienced by the different generations of consumers.

Consumer age in technology adoption

Weijters, Rangarajan, Falk and Schillewaert (2007:4) and Dean (2008:226) state that there has been a shortage of research specifically on the influence of consumer age on SST adoption. Information on the effect of consumer age on adoption behaviour could be invaluable in strategy formulation as a result of the differing adoption behaviours displayed by different generational cohorts (Hawkins & Mothersbaugh, 2010:124; Dean, 2008:226). Consumer generations are described as age cohorts that have been moulded together and represent groups of consumers who express similar "thought processes, reactions and behaviours" (Jones, 2014:11). These behaviours have been found to extend to consumers' technology adoption behaviour due to similar levels of technology exposure (Hawkins & Mothersbaugh, 2010:124; Jaafar & Ramayah, 2007:180). This view is supported by Parasuraman and Colby (2015:73), who state that a key area of future research in technology adoption, and specifically in TR (and TRI 2.0), is the impact that different "generational cohorts" have on technology adoption. It follows that consumers express different technology adoption behaviours based on their exposure to and experience with the latest technologies (Parasuraman & Colby, 2015; Hawkins & Mothersbaugh, 2010). Jones (2014:27) builds on this view and states that technological changes are one of the prominent differential factors in respect of different generations. As a result, consumer generations were used as a segmentation tool for the age demographic in this study. Based upon these findings, the following hypothesis can be formulated for the study:

H_2: *Consumer age correlates positively with technology readiness.*

RESEARCH METHODOLOGY

This study applied a quantitative research approach using a predetermined structured questionnaire which, according to Burns and Bush (2010:235), is effective for gathering information from a large number of respondents. A descriptive research design was used. A descriptive research design allows the researcher to understand the "who, why, what, when and how" and is suitable when one wishes to "project a study's findings to a larger population" (Berndt & Petzer, 2011:32; Burns & Bush, 2010:149). The target population for this study included individuals who had travelled either domestically or internationally with an airline and who were South African citizens. A two-stage non-probability quota and convenience sampling method was used to select respondents from the target population to ensure that only travellers who had used an airline in the preceding twelve months (2017 period) were included in the study. A total of 315 completed questionnaires were collated, cleaned and put forward for the data analysis stage.

A structured questionnaire consisting of four main sections was designed. Section A of the questionnaire consisted of five questions designed to capture the respondents' prior usage, current usage and future behavioural intentions towards self-service technologies in the airline industry. Section B was adapted from the 16-item TRI 2.0 scale developed by Parasuraman and Colby (2015). This section included four sub-sections, one for each dimension of TR, and made use of interval scales to measure the technology readiness of the respondent. Each sub-section included four statements and addressed one of the four dimensions (optimism, innovativeness, discomfort and insecurity) of TR as proposed by Parasuraman and Colby (2001, 2015). Section C investigated respondents' behavioural intentions towards airline mobile applications. Sections B and C made use of multiple-item, unlabelled, seven-point scales. Only the end points of the scale were labelled, with "strongly disagree" at one end and "strongly agree" at the other. Respondents were asked to indicate their degree of agreement or disagreement with each presented statement. The final section of the questionnaire, Section D, related to the

demographic profile of the respondents and collected information on their age (generational cohorts), gender, ethnicity, economic status, current personal gross income per annum before deductions, and highest education level completed. This section was structured using nominal and ordinal scales.

All data were analysed for completeness, captured, cleaned and entered for analysis into the software program SPSS 21 (Statistical Package for Social Sciences). A number of statistical procedures were used to analyse the collected data. These statistical procedures included group statistics, descriptive analysis, correlation analysis, factor analysis and regression analysis (hierarchical regression analysis). The Statistical Consultation Service of the University of Johannesburg (STATKON) assisted with the data analysis.

Validity and reliability of results

The reliability and validity of the measurement instrument were tested using Cronbach's alpha and exploratory factor analysis respectively. The Cronbach's alpha scores for the four TR dimensions were 0.875 for optimism, 0.916 for innovativeness, 0.820 for discomfort, and 0.769 for insecurity, while the scores for overall level of TR and for behavioural intentions towards airline mobile application adoption were 0.854 and 0.972 respectively. For validity, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were used, and all the constructs were found to be valid and were therefore retained in their original forms.

DISCUSSION OF RESULTS

Profile demographics

The sample group (n = 296) was well represented by an almost equal split of male (50.7%) and female (49.3%) respondents. There was a relatively even age group split between the various age group brackets ranging between 23 and 70, with the majority of the respondents being white (76.7%). Concerning gross personal income per annum before deductions, the majority (60.8%) of respondents earned more than R250 000 per annum before deductions, and 64.5% of the sample group perceived their economic status to be above average or higher. Lastly, the vast majority (83.4%) of the respondents had a post-matric certificate or diploma, a degree or a postgraduate degree.

Group statistics

Consumer age and dimensions of technology readiness group statistics

From Table 1 it can be observed that the overall mean scores for the dimensions of technology readiness displayed by consumers of different age groups were, from highest to lowest, 4.38 (30 years or younger), 4.18 (31 to 51 years) and 3.83 (51 years and older). These findings show a clear trend whereby older consumers (51 years or older) are less likely to adopt and use technology than younger consumers (30 years or younger, and those between 31 and 51 years). This trend is in line with findings in the presented literature on consumer age in technology adoption, which underlines the negative relationship of consumer age with technology adoption (Venkatesh, Thong & Xu, 2012:162; Lee et al., 2010:49; Simon & Usunier, 2007:166). To determine whether the observed differences are significant, a Kruskal Wallis test was used. A p-value of < 0.05 indicates that a significant relationship exists, and a p-value of > 0.05 indicates that no significant relationship exists (Pallant, 2010:227). For consumer age, significant differences were observed on the optimism dimension (0.000 where df = 2) and discomfort dimension (0.006 where df = 2). It can further be observed that a clear difference is

present on the optimism dimension, where respondents younger than 30 (mean = 4.95) appear to be more optimistic towards technology than respondents aged 31–51 (mean = 4.22) and respondents older than 51 (mean = 3.26). The opposite trend is apparent on the discomfort dimension, where respondents older than 51 (mean = 3.52) are shown to be more uncomfortable with technology than respondents aged 30 or younger (mean = 3.00) and 31–51 (mean = 3.16).

Table 1: Group statistics for consumer age and the dimensions of technology readiness

Dimensions of technology readiness							
Optimism	**N**	**Mean**	**Standard dev.**	**Innovativeness**	**N**	**Mean**	**Standard dev.**
30 or younger	99	4.95	1.312	30 or younger	99	5.94	0.854
31–51	107	4.22	1.406	31–51	107	5.97	0.925
Older than 51	90	3.26	1.451	Older than 51	90	5.86	1.164
Discomfort	**N**	**Mean**	**Standard dev.**	**Insecurity**	**N**	**Mean**	**Standard dev.**
30 or younger	99	3.00	1.129	30 or younger	99	4.36	1.221
31–51	107	3.16	1.356	31–51	107	4.33	1.336
Older than 51	90	3.52	1.151	Older than 51	90	4.29	1.497
Overall TR	**N**	**Mean**					
30 or younger	99	4.38					
31–51	107	4.18					
Older than 51	90	3.83					

Descriptive statistics

Descriptive statistics for the dimensions of technology readiness

The overall mean for the dimensions of technology readiness construct was 4.34, indicating that the majority of respondents demonstrated a medium overall level of technology readiness (> 4.1) and were therefore likely to adopt airline mobile applications in the airline industry. The dimension for which respondents indicated their highest level of agreement with the presented statements was the optimism dimension (overall mean = 5.93), which indicates that the sample group generally displayed high levels of optimism towards technology in general. The statement which respondents agreed with the most was QB1.2, “Technology gives me more freedom of mobility (ability to perform tasks on the go)” (mean = 6.23 and standard deviation = 0.970). The dimension for which respondents indicated their lowest level of agreement with the presented statements was the discomfort dimension (overall mean = 3.22), which indicates that the sample group was generally comfortable with technology. The statement which respondents agreed with the least was QB3.1, “When I get technical support from a provider of a high-tech product or service, I feel as if I am being taken advantage of by someone who knows more than I do” (mean = 2.91 and standard deviation = 1.451).

Table 2: Descriptive statistics for the dimensions of technology readiness

Dimensions of technology readiness					
Optimism	Mean	Standard dev.	Innovativeness	Mean	Standard dev.
QB1.1	5.93	1.074	QB2.1	4.03	1.748
QB1.2	6.23	0.970	QB2.2	3.77	1.701
QB1.3	5.89	1.152	QB2.3	4.45	1.744
QB1.4	5.67	1.365	QB2.4	4.43	1.702
Overall score	**5.93**	**1.140**	**Overall score**	**4.17**	**1.724**
Discomfort	Mean	Standard dev.	Insecurity	Mean	Standard dev.
QB3.1	2.91	1.451	QB4.1	4.16	1.685
QB3.2	3.41	1.511	QB4.2	4.33	1.719
QB3.3	3.03	1.540	QB4.3	4.94	1.701
QB4.4	3.51	1.628	QB4.4	3.88	1.898
Overall score	**3.22**	**1.533**	**Overall score**	**4.33**	**1.751**
Overall TR	Mean	Standard dev.			
Overall score	**4.34**	**1.537**			

Descriptive statistics for behavioural intentions towards airline mobile applications

The overall mean for behavioural intentions towards airline mobile applications was 5.30, indicating that the majority of respondents agreed with the presented statements and would be likely to continue using or adopting mobile applications in the future. The statement which respondents jointly agreed with the most was QC1.2, "I plan to (continue/start) using airline mobile app services when I travel via airlines in the future" (mean = 5.37 and standard deviation = 1.570). The statement which respondents agreed with the least was QC1.3, "I plan to (continue/start) using airline mobile app services over traditional self-service technologies (online websites, self-check-in kiosks etc.)" (mean = 5.14 and standard deviation = 1.635).

Table 3: Descriptive statistics for behavioural intentions towards airline mobile applications

Behavioural intentions towards airline mobile applications	Mean	Standard dev.
QC1.1	5.37	1.585
QC1.2	5.37	1.570
QC1.3	5.14	1.635
QC1.4	5.33	1.549
Overall score	**5.30**	**1.585**

Correlation analysis

Before proceeding to the regression analysis, the hypotheses set for the study were tested for correlation to ensure that they were suitable for further analysis. The results of the correlation analysis for the various hypotheses set out for the study are presented in Table 4.

Table 4: Correlation analysis results for the hypotheses set for the study

Hypothesis	Pearson correlation (r)	Sig. (1-tailed)
H_1	0.540	0.000
H_2	–0.253	0.000

Both the hypotheses set for the study were strongly correlated, and the presented relationships were found to be significant. The stronger correlation was evident for hypothesis H_1, where technology readiness was found to be strongly correlated (0.540) with airline mobile application adoption, and the relationship was deemed significant ($p = 0.000$). The weaker correlation was

evident for hypothesis H_2, where consumer age was found to be moderately correlated (–0.253) with technology readiness, and the relationship was deemed significant ($p = 0.000$).

Regression analysis

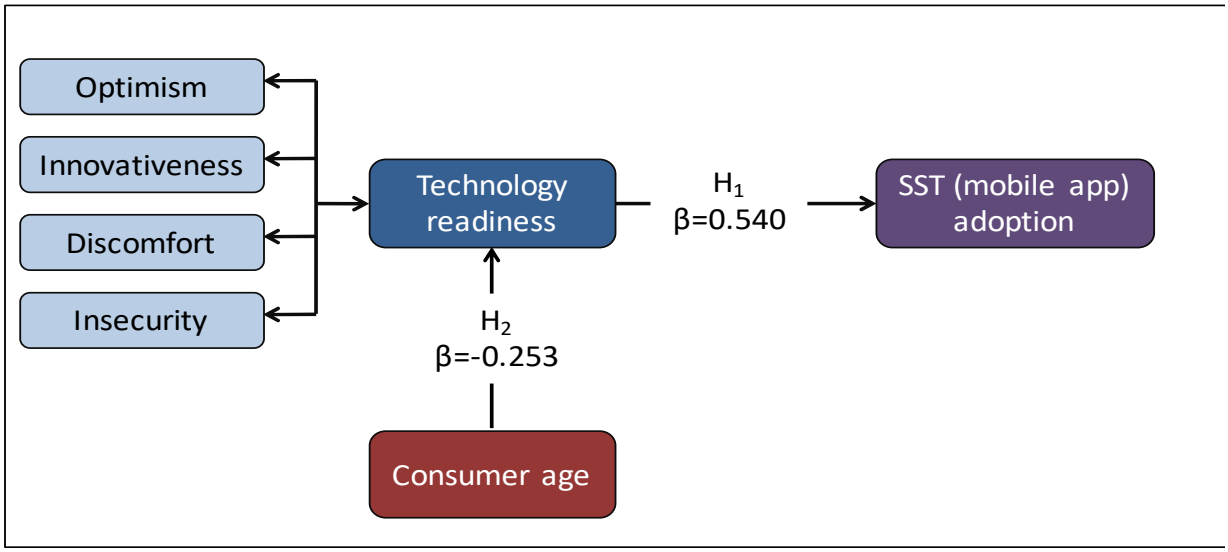
Before commencement of the regression analysis, the assumptions of regression analysis were observed, and all of them were met. All the original scales set for the study were deemed valid during the exploratory factor analysis and were therefore retained for the regression analysis. The results of the regression analysis are presented in Table 5.

Table 5: Regression analysis summary for the hypotheses set for the study

Hypothesis	Dependent variable	Independent variable	*P*-value	Beta value	R^2 value	Adjusted R^2 value
H_1	Airline mobile app adoption	Technology readiness	0.000	0.540	0.540	0.292
H_2	Technology readiness	Consumer age	0.000	–0.253	0.064	0.061

For hypothesis H_1 a positive relationship was predicted between technology readiness and airline mobile application adoption. The results from the regression analysis support the hypothesis ($\beta = 0.540$, $p < 0.05$) and accordingly the null hypothesis was rejected. The R^2 value of 0.292 indicates that technology readiness explains 29.2% of the total variance of airline mobile application adoption. For hypothesis H_2 a negative relationship was predicted between consumer age and technology readiness. The results from the regression analysis support the hypothesis ($\beta = –0.253$, $p < 0.05$) and accordingly the null hypothesis was rejected. The R^2 value of 0.061 indicates that consumer age explains 6.1% of the total variance of technology readiness. Figure 1 presents a summary of the regression analysis results.

Figure 1: Regression analysis results for the influence of technology readiness and perceptions towards mobile application adoption



The alternative hypotheses for both hypothesis H_1 (technology readiness and airline mobile application adoption) and hypothesis H_2 (consumer age and technology readiness) were accepted.

IMPLICATIONS AND RECOMMENDATIONS

The following recommendations are proposed to the airline industry to enhance the acceptance of SSTs and prevent financial loss inherent in development and implementation.

Recommendation 1: Introduction of technology-based products

When planning for the launch of new technology-based products or services, companies should follow a structured launch process that is centred on technology readiness, and consumer age should be a key consideration in determining each target market's level of technology readiness. Accurately defining the desired consumer target market is the key starting point when determining the feasibility of launching a new technology-based product or service. When defining the target market, it is therefore essential to have a clear understanding of the generations being targeted.

Once the target market has been accurately identified, a two-stage marketing research process should be conducted. The first stage should involve a quantitative survey that focuses on determining the average level of technology readiness of the defined target market. Despite the high costs involved in conducting quantitative studies, this step is essential to determine the feasibility of launching the product before significant resources are committed to its development. Conducting this research would allow companies to accurately determine the readiness of their defined target market to trial and ultimately adopt the new product or service. An analysis of technology readiness would provide insight into whether the defined target market consists of technological optimists or innovators, which relates to how positive they would be to the introduction of the new product or service. At the same time, the findings would allow the key adoption inhibitors relating to the product or service to be identified. The second stage of the marketing research should involve conducting focus groups that aim to narrow down the findings from the quantitative stage. Here specific drivers and inhibitors would be identified and explored, such as the need for a specific feature or a very simple design. This process should be conducted for each defined target market or generational cohort to ensure that their needs are addressed in the subsequent product development stage or through the resultant communication strategies.

Once information has been gathered and refined, companies should decide whether the drivers and inhibitors of adoption could be addressed in the product development stage or through the resultant communication strategies. Inhibitors relating to the usability of the product or service should be easily identified from findings on perceived ease of use and could be easily addressed in the product development stage rather than through communication strategies. Such an approach should ensure that companies easily identify the key barriers and drivers of adoption relating to a specific technology-based product or service, which could then be incorporated into their product development and communication strategy. These strategies should be tailored for each generational cohort being targeted. This would enable companies to maximise the successful introduction of technological products or services in the future.

Recommendation 2: Airline mobile application introduction

Based on the findings of this study, airline and airport companies should implement strategies based on each target market's generational cohort to ensure the successful adoption of airline

mobile applications. When targeting a specific generation of consumers with airline mobile apps, the companies should develop communication strategies based on the targeted generation's scores across the four dimensions of technology readiness. With this information on hand, airline and airport companies could develop communication strategies to enhance the drivers and overcome the barriers associated with each generation and thus improve the adoption and usage of airline mobile applications. Airline and airport companies looking to target consumers aged 30 or younger ("Tween" and late "Generation Y" consumers) should adopt benefit-led communication which focuses on the core benefits provided by airline mobile apps, such as live flight status updates. This group of respondents scored highly on both the optimism dimension (mean = 4.95) and insecurity dimension (mean = 5.94), so it is imperative that they be exposed to the key benefits provided by airline mobile applications. At the same time, when developing communication strategies targeting this consumer age group, care should be taken to minimise the perceived risk of use, particularly financial risk. This recommendation takes account of the high score generated by respondents aged 30 or younger on the insecurity dimension (mean = 4.36). Airline and airport companies looking to target consumers aged 31–51 or those older than 51 ("Generation X", "Baby Boom Generation" and "Depression Generation" consumers) should adopt a communication strategy which focuses on the primary benefits of airline mobile application usage, including ease of use. This recommendation takes account of the high scores achieved by these age groups on the innovativeness dimension (mean score = 5.97 and 5.86 respectively; cf. Table 1). Furthermore, communicating the ease with which airline mobile applications can be operated should assure these consumers that the benefits of airline mobile applications include the simplicity of operating them. This is particularly relevant for respondents aged older than 51, who displayed the highest overall score on the discomfort dimension (mean = 3.52; cf. Table 1), which relates to concerns about being unable to operate new technologies effectively.

If airline and airport companies look to adopt a broad communication strategy that is relevant to all the consumer generations, then they should choose one which focuses on basic benefits (self-check-in) and simplicity of use. Such a strategy would allow the companies to be relevant to all consumer generations, as the inherent basic benefits of airline mobile applications would suit the optimistic dimension characteristics of consumers aged 30 or younger (mean = 4.95) and those aged 31–51 (mean = 4.22), while ensuring that the benefits are not overbearing for respondents aged older than 51 (mean = 3.26). Similarly, communication that reduces the perceived financial risk of adoption and that reassures consumers on ease of use would allow airline and airport companies to generate usage confidence in consumers aged 30 or younger (insecurity dimension mean score = 4.36), those aged 31–51 (insecurity dimension mean score = 4.33) and those older than 51 (insecurity dimension mean score = 4.29), and should ensure that consumers older than 51 are not deterred by concerns about being unable to operate airline mobile apps effectively (discomfort dimension mean score = 3.52) (cf. Table 1). Thus, when targeting a broad consumer age group, companies should communicate the flight booking, self-check-in and boarding pass functions with the inclusion of a virtual or step-by-step product demonstration to enhance consumer usage confidence. Consumers younger than 30 looking for more advanced functionality could still be expected to adopt these functions, as these consumers are more comfortable with technology in general and therefore more capable of understanding and utilising the more advanced benefits of airline mobile applications which may not be covered in communications (Jones, 2014:28; Bolton, Parasuraman, Hoefnagels, Migchels, Kabadayi, Gruber, Loureiro & Solnet, 2013:245; Hawkins & Mothersbaugh, 2010:133).

For the roll-out of communication strategies, airline and airport companies should restrict communication to available communication platforms within the industry, such as airport

banners, airport TVs and online websites. Such an approach should reduce the spill-over that prevails when traditional above-the-line media target such a niche target market and should ensure that the defined target market is reached effectively. To increase the potential adoption of airline mobile applications, the use of dedicated mobile application assistant stations is recommended. At these stations airport or airline employees would be present to answer passenger questions and assist with feature usage. Such an approach would reduce negative experiences related to initial trial and enhance passengers' perceptions of the ease of use, and ultimately the usefulness, of airline mobile applications. These assistant stations should remain in place until the use of airline mobile applications has become commonplace.

LIMITATIONS OF THE STUDY AND FUTURE RESEARCH OPPORTUNITIES

The main limitation of this study is that the majority of the sample group resided in the Gauteng province of South Africa, but the sample group was not limited to this province. The sample group was also characterised by high income and education levels and may not be representative of the general South African population or other geographic populations. Future research could be extended to include new technologies in different industries, cultures and geographic regions of South Africa. Secondly, the introduction of various additional demographic variables (gender, education, income, etc) could be included in the presented model.

CONCLUSION

The airline industry, driven by rising operating costs (jet fuel costs, among others) and by increased consumer demand for improved services (such as live flight status updates), has invested significantly in areas of self-service technology, particularly in mobile applications. The integration of airline mobile applications allows airline and airport companies to include the passenger as a vital part of the service delivery process, enhancing customer service and reducing fixed employee costs through the elimination of traditional face-to-face service transactions. Despite the financial investment in and benefits of airline mobile applications, adoption rates have been slow, with passengers needing to be convinced of the value offered. For this reason it is crucial for airline and airport companies to determine the readiness of their respective target markets to adopt these new technologies. TRI 2.0 has been shown to be an effective predictor of consumers' technology adoption behaviour and should therefore form an important part of the introduction of any new technology-based product or service.

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